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(54) **Piezoelectric actuator using bimorph element.**

(57) A piezoelectric actuator using a bimorph element, comprises:

a bimorph element having at least one pair of piezo elements respectively on two surfaces of a central electrode and an electrode formed on a surface of each piezo element which is opposite to a surface contacting the central electrode, the piezo elements formed on the two surfaces of the central electrode being polarized in the same direction with respect to a direction of thickness of the bimorph element;

a drive input circuit arranged such that a cathode of a first directional voltage limiting circuit is connected to one electrode contacting a positively polarized surface of the piezo element whose negatively polarized surface contacts the central electrode, that an anode of a second directional voltage limiting circuit is connected to the other electrode contacting a negatively polarized surface of the piezo element whose positively polarized surface contacts the central electrode, that an anode of the first directional voltage limiting circuit and a cathode of the second directional voltage limiting circuit are commonly connected to constitute one drive input terminal, and that the central electrode serves as the other drive input terminal;

a constant voltage source for applying a constant voltage to the drive input circuit; and

a polarity switching circuit, arranged between the constant voltage source and the drive input circuit, for switching a polarity of the constant voltage source with respect to the one and the other drive input terminals of the drive input circuit.

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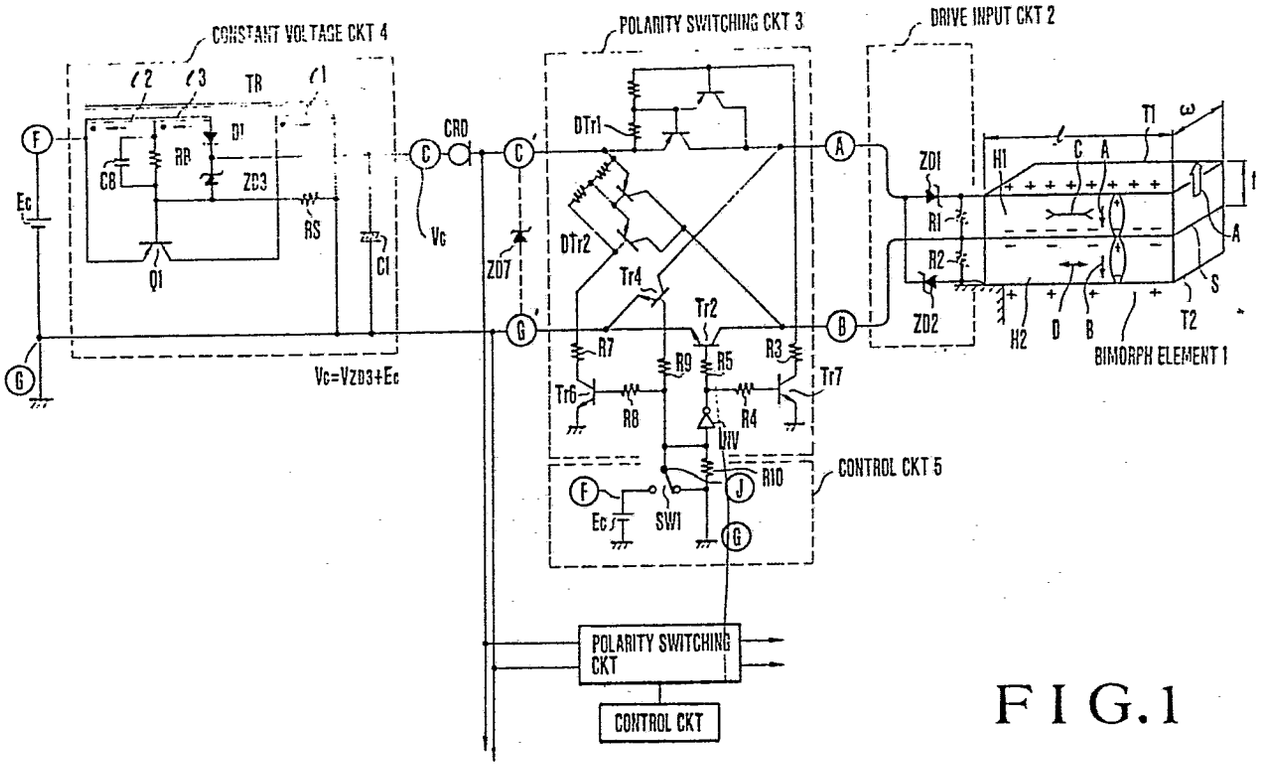
CONSTANT VOLTAGE CKT 4
POLARITY SWITCHING CKT 3
DRIVE INPUT CKT 2
CONTROL CKT 5
BIMORPH ELEMENT 1
POLARITY SWITCHING CKT
CONTROL CKT
Vc=VZD3+Ec

FIG.1

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EUROPEAN SEARCH REPORT

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Application Number

EP 84 30 8513

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	FR-A-2 127 657 (BRAUN AG et al.) * Page 2, line 38 - page 3, line 11; figure 1; page 6, lines 9-39 *	1,3,5, 13	H 01 L 41/08 H 01 L 41/04
A	GB-A-2 011 734 (SONY CORP.) * Abstract; figures; page 4, lines 17-79 *	1,3,4, 13	
A	US-A-3 821 747 (MASON) * Abstract; figure 4; column 5, line 23 - column 6, line 2 *	2,3,13	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

H 01 L 4

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	06-09-1988	MIMOUN B.J.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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